WHAT IS CLAIMED IS:

1. A lawn cutting machine comprising:

motor having an output shaft;

a rotatable cutting blade rotationally fixed on a blade shaft;

an adjustable torque transmitting mechanism operably connected between said output shaft and said blade shaft, said torque transmitting mechanism having a variable rotational speed ratio between said blade shaft and said output shaft;

a variable speed transmission operably coupled to said output shaft and having a variable speed driven shaft;

a driven wheel coupled with said driven shaft and engagable with the ground for propelling said machine at a ground speed;

an electronic control unit means, said control unit operably coupled with said torque transmitting mechanism wherein said control unit means adjusts the rotational speed ratio between said blade shaft and said output shaft, said control unit means further operably coupled with said transmission wherein said control unit means adjusts the speed of said driven shaft, wherein said control unit means monitors the blade speed signal and adjusts one of the speed of said driven shaft and the rotational speed ratio to raise the blade speed when the blade speed falls below a predetermined rate;

a blade speed sensor having an output to said control unit means with a blade speed signal representative of the speed of said rotatable cutting blade; and

a ground speed sensor having an output to said control unit means with a ground speed signal representative of the ground speed of said machine.

2. The lawn cutting machine of claim 1 wherein when the blade speed falls below said predetermined rate said control unit means determines if the rotational speed ratio between said blade shaft and said output shaft is less than a predetermined maximum ratio and, if said rotational speed ratio is less than said predetermined maximum ratio, said control unit means adjusts said torque transmitting mechanism to increase the speed of said blade shaft relative to said output shaft and, if said rotational speed ratio is not less than said predetermined maximum ratio, said control unit means decreases the speed of said driven shaft.

3. The lawn cutting machine of claim 1 wherein said torque transmitting mechanism comprises an adjustable diameter pulley.

4. The lawn cutting machine of claim 1 wherein said control unit means monitoring of said blade speed signal further comprises determining when the blade speed

exceeds a predetermined maximum speed and, when said blade speed exceeds said predetermined maximum speed, said control unit means adjusts the rotational speed ratio to decrease the speed of said blade shaft relative to said output shaft.

5. The lawn cutting machine of claim 1 wherein said blade speed sensor is positioned to measure the rotational speed of said blade shaft.

6. The lawn cutting machine of claim 1 wherein said ground speed sensor is positioned to measure the rotational speed of said driven shaft.

7. A lawn cutting machine comprising:

a motor having an output shaft;

a rotatable cutting blade rotationally fixed on a blade shaft;

a variable speed torque transmitting mechanism operably disposed between said output shaft and said blade shaft, said torque having a variable rotational speed ratio between said blade shaft and said output shaft;

a variable speed transmission operably coupled to said output shaft and having a variable speed driven shaft, said motor, output shaft, transmission and driven shaft together defining a drive train;

a driven wheel coupled with said driven shaft and engagable with the ground for propelling said machine at a ground speed;

an electronic control unit, said control unit having a speed ratio change output operably coupled to said torque transmitting mechanism, said control unit having a speed change output operably coupled to said transmission;

a blade speed sensor having an output connected to said control unit with a blade speed signal representative of the speed of said rotatable cutting blade;

a ground speed sensor having an output connected to said control unit with a ground speed signal representative of the ground speed of said machine;

whereby the blade speed signal is monitored and one or both of the speed of said driven shaft and the rotational speed ratio of the blade speed are raised when the blade speed falls below a predetermined rate.

8. The lawn cutting machine of claim 7 wherein said motor is an internal combustion engine.

9. The lawn cutting machine of claim 7 wherein when the blade speed falls below said predetermined rate said control unit determines if the rotational speed ratio between said blade shaft and said output shaft is less than a predetermined maximum ratio and, if said rotational speed ratio is less than said predetermined maximum ratio, said control

unit adjusts said torque transmitting mechanism to increase the speed of said blade shaft relative to said output shaft and, if said rotational speed ratio is not less than said predetermined maximum ratio, said control unit decreases the speed of said driven shaft.

10. The lawn cutting machine of claim 7 wherein said torque transmitting mechanism comprises an adjustable diameter pulley.

11. The lawn cutting machine of claim 7 wherein said control unit includes means for determining when the blade speed exceeds a predetermined maximum speed and, when said blade speed exceeds said predetermined maximum speed, said control unit adjusts the rotational speed ratio to decrease the speed of said blade shaft relative to said output shaft.

12. The lawn cutting machine of claim 7 wherein said blade speed sensor is positioned to measure the rotational speed of said blade shaft.

13. The lawn cutting machine of claim 7 wherein said ground speed sensor is positioned to measure the rotational speed of said driven shaft.

14. A lawn cutting machine comprising:

a motor having an output shaft;

a rotatable cutting blade rotationally fixed on a blade shaft;

a variable speed torque transmitting mechanism operably disposed between said output shaft and said blade shaft, said torque having a variable rotational speed ratio between said blade shaft and said output shaft;

a variable speed transmission operably coupled to said output shaft;

a driven wheel operably coupled to said transmission, whereby said machine may be propelled;

an electronic control unit, said control unit having a speed ratio change output operably coupled with said torque transmitting mechanism, said control unit having a speed change output operably coupled with said transmission, said control unit programmed with a quality cut algorithm and a quick cut algorithm;

a blade speed sensor having an output to said control unit with a signal representative of the speed of said rotatable cutting blade;

a ground speed sensor having an output to said control unit with a signal representative of the ground speed of said machine; and

a user-operable input device having an output connected to said electronic control unit to select between said quality cut algorithm and said quick cut algorithm; whereby:

operating said machine in accordance with said quality cut algorithm includes said control unit monitoring the speed of said cutting blade and adjusting one of the ground speed

and the rotational speed ratio between said output shaft and said blade shaft to raise the blade speed when the blade speed falls below a predetermined blade speed value; and

operating said machine in accordance with said quick cut algorithm includes said control unit monitoring the ground speed of said machine and adjusting one of the ground speed and the rotational speed ratio between said output shaft and said blade shaft to raise the ground speed when the ground speed falls below a selected ground speed value.

15. The lawn cutting machine of claim 14 wherein said torque transmitting mechanism comprises an adjustable diameter pulley.

16. The lawn cutting machine of claim 14 wherein both said quality cut algorithm and said quick cut algorithm include said control unit comparing the blade speed with a predetermined maximum speed and when the blade speed exceeds said predetermined maximum speed, said control unit adjusts the rotational speed ratio of the torque transmitting device to decrease the speed of said blade shaft relative to said output shaft.

17. The lawn cutting machine of claim 14 wherein said quality cut algorithm further includes, when the blade speed falls below said predetermined blade speed value, said control unit determining if the rotational speed ratio between said output shaft and said blade shaft is less than a predetermined maximum rotational speed ratio and, if said rotational speed ratio is less than said predetermined maximum rotational speed ratio value, said control unit adjusts said torque transmitting mechanism to increase the speed of said blade shaft relative to said output shaft and, if said rotational speed ratio is not less than said predetermined maximum rotational speed ratio value, said control unit decreases the ground speed of said machine.

18. The lawn cutting machine of claim 14 wherein said quick cut algorithm further includes, when the ground speed falls below said selected ground speed value, said control unit adjusting said transmission until the ground speed is equivalent to said selected ground speed or said transmission is positioned in a predetermined maximum setting, and wherein if said transmission is positioned in said predetermined maximum setting and said ground speed is less than said selected ground speed, said control unit adjusts said rotational speed ratio to decrease the relative speed of said blade shaft relative to said output shaft.

19. The lawn cutting machine of claim 14 wherein said motor is an internal combustion engine and said lawn cutting machine further comprises a sensor operably coupled to said engine and providing a signal to said control unit representative of the output of said engine; and

wherein said quick cut algorithm further includes, when the ground speed falls below said selected ground speed value, said control unit determining if the output of said engine is less than a predetermined maximum output value and, if output of said engine is less than said predetermined maximum output value, said control unit adjusts said transmission to increase the ground speed of said machine and, if the output of said engine is not less than said predetermined maximum output value, said control unit adjusts said rotational speed ratio to decrease the relative speed of said blade shaft relative to said output shaft.

20. A lawn cutting machine comprising:

an internal combustion engine adapted to run at a substantially constant engine speed and having an output shaft;

a rotatable cutting blade rotationally fixed on a blade shaft;

a torque transmitting means operably disposed between said output shaft and said blade shaft, said torque transmitting means transferring rotational motion from said output shaft to said blade shaft and selectively adjusting a rotational speed ratio between said blade shaft and said output shaft;

a transmission operably coupled to said output shaft and having a variable speed driven shaft;

a driven wheel coupled with said driven shaft and engagable with the ground for propelling said machine at a ground speed;

an electronic control unit means, said control unit means operably coupled with said torque transmitting mechanism for adjusting the rotational speed ratio between said blade shaft and said output shaft, said control unit means operably coupled with said transmission and adjusting the speed of said driven shaft;

a blade speed sensor providing said control unit means with a blade speed signal representative of the speed of said rotatable cutting blade;

a ground speed sensor providing said control unit means with a ground speed signal representative of the ground speed of said machine; and

wherein said control unit means monitors the blade speed signal and adjusts one of the speed of said driven shaft and the rotational speed ratio to maintain the blade speed at a substantially constant blade speed value.

21. A method of cutting grass with a lawn cutting machine having a motor with an output shaft, a rotatable cutting blade and a driven shaft with a driven wheel coupled thereto, said output shaft operably coupled to said cutting blade and said driven

wheel engagable with the ground for propelling said machine at a ground speed, said method comprising monitoring the speed of said cutting blade; and

adjusting one of the speed of said cutting blade and said ground speed to maintain the speed of said cutting blade at a substantially constant blade speed value while simultaneously allowing the ground speed of said machine to vary.

22. The method of claim 21 wherein said motor comprises an internal combustion engine and said method further comprises the step of operating said engine at a substantially constant engine speed.

23. The method of claim 22 wherein said step of operating said engine at a substantially constant speed comprises the use of a mechanical governor to control the engine speed.

24. The method of claim 21 wherein said step of monitoring the speed of said cutting blade comprises producing a blade speed signal representative of the speed of said cutting blade and communicating said blade speed signal to an electronic control unit.

25. The method of claim 21 further comprising the step of monitoring the ground speed of said machine.

26. The method of claim 25 wherein said step of monitoring the ground speed of said machine comprises producing a ground speed signal representative of the ground speed of said machine and communicating said ground speed signal to an electronic control unit.

27. The method of claim 21 wherein adjusting the speed of said cutting blade comprises adjusting the effective diameter of a variable diameter pulley operably disposed between said output shaft and said cutting blade.

28. The method of claim 21 wherein adjusting the ground speed comprises adjusting a continuously variable transmission operably disposed between said output shaft and said driven shaft.

29. A method of cutting grass, said method comprising:

providing a lawn cutting machine having a user-operable input device, a motor with an output shaft, a rotatable cutting blade and a driven shaft with a driven wheel coupled thereto, said output shaft operably coupled to said cutting blade and said driven shaft, said driven wheel engagable with the ground for propelling said machine at a ground speed;

monitoring the speed of said cutting blade;

monitoring the ground speed of said machine; and

selecting one of a quality cut algorithm and a quick cut algorithm based upon a user input and operating said machine in accordance with the selected algorithm wherein operating said

machine in accordance with said quality cut algorithm includes adjusting one of the speed of said cutting blade and the ground speed to raise said blade speed when the speed of said cutting blade falls below a predetermined blade speed value and wherein operating said machine in accordance with said quick cut algorithm includes adjusting one of the speed of said cutting blade and the ground speed to raise said ground speed when the ground speed falls below a selected ground speed value.

30. A method of cutting grass, said method comprising:

providing a lawn cutting machine having an internal combustion engine with an engine output shaft, a rotatable cutting blade and a driven shaft with a driven wheel coupled thereto, said engine output shaft operably coupled to said cutting blade and said driven shaft, said driven wheel engagable with the ground for propelling said machine at a ground speed;

operating said engine at a substantially constant engine speed;

monitoring the speed of said cutting blade;

monitoring the ground speed of said machine;

adjusting one of the speed of said cutting blade and said ground speed when one of the speed of said cutting blade and said ground speed falls below a predetermined value without directly adjusting the rotational speed of said engine output shaft.

31. The method of claim 30 wherein said step of operating said engine at a substantially constant engine speed comprises the use of a mechanical governor to control the engine speed.